

CLAIMS

1. A data transfer control device for transferring data among a plurality of nodes that are connected to a bus, said data transfer control device comprising:

packet assembly means for reading control information of a packet from a control information area of a randomly accessible storage means and reading data of said packet corresponding to said control information from a data area of said randomly accessible storage means, said randomly accessible storage means being divided into said control information area for control information that is written thereto by an upper layer and said data area for data that is written thereto by an upper layer; and

link means for providing a service for transferring said read-out packet to each of nodes.

2. The data transfer control device as defined in claim 1,

wherein said packet assembly means obtains a data pointer indicating an address of data that is to be read from said data area, from control information that has been read from said control information area, and uses the obtained data pointer to read data from said data area.

3. The data transfer control device as defined in claim 2,

wherein said packet assembly means utilizes a period of time during which said link means is creating error-checking information for said control information of said packet, to obtain a data pointer from control information.

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4. The data transfer control device as defined in claim 1,

wherein said packet assembly means updates a control information pointer indicating an address of control information to be read from said control information area when it is determined based on packet format identification information included in said control information of said packet that said control information of said packet is read, and updates a data pointer indicating an address of data that is to be read from said data area when it is determined based on said packet format identification information that said data of said packet is read.

5. The data transfer control device as defined in claim 2,

wherein said packet assembly means updates a control information pointer indicating an address of control information to be read from said control information area when it is determined based on packet format identification information included in said control information of said packet that said control information of said packet is read, and updates a data pointer indicating an address of data that is to be read from said data area when it is determined based on said packet format

identification information that said data of said packet is read.

6. The data transfer control device as defined in claim 3,

5 wherein said packet assembly means updates a control information pointer indicating an address of control information to be read from said control information area when it is determined based on packet format identification information included in said control information of said packet that said control information of said packet is read, and updates a data pointer indicating an address of data that is to be read from said data area when it is determined based on said packet format identification information that said data of said packet is read.

10 7. The data transfer control device as defined in claim 1, further comprising:

15 control information creation means for creating control information and writing said control information to said control information area, during processing for fetching data to said data area; and

20 transmission start means for instructing a start of transmission of a packet, on condition that both data fetch processing and control information write processing have been completed.

25 8. The data transfer control device as defined in claim 2, further comprising:

control information creation means for creating control information and writing said control information to said control information area, during processing for fetching data to said data area; and

transmission start means for instructing a start of transmission of a packet, on condition that both data fetch processing and control information write processing have been completed.

9. The data transfer control device as defined in claim 3, further comprising:

control information creation means for creating control information and writing said control information to said control information area, during processing for fetching data to said data area; and

transmission start means for instructing a start of transmission of a packet, on condition that both data fetch processing and control information write processing have been completed.

10. The data transfer control device as defined in claim 4, further comprising:

control information creation means for creating control information and writing said control information to said control information area, during processing for fetching data to said data area; and

transmission start means for instructing a start of

transmission of a packet, on condition that both data fetch processing and control information write processing have been completed.

5 11. A data transfer control device for transferring data among a plurality of nodes that are connected to a bus, said data transfer control device comprising:

transmission start means for instructing transmission start of a packet for which both data fetch processing and control information write processing have been completed, a send packet area of a randomly accessible storage means being divided into a plurality of channels and said packet being one of packets stored in said plurality of channels;

10 read means for reading a packet for which transmission start has been instructed, from a channel corresponding to a send packet area; and

15 link means for providing a service for transferring said read-out packet to each of nodes.

20 12. The data transfer control device as defined in claim 11, further comprising:

means for instructing data fetch for a packet of one channel of said plurality of channels while a packet of another channel is being transmitted.

25 13. The data transfer control device as defined in claim 11, further comprising:

means for instructing data fetch and setting a data-
fetch-in-progress flag on condition that said data-fetch-in-
progress flag has been cleared, and clearing said data-
fetch-in-progress flag on condition that data fetch has ended;
5 and

means for instructing transmission start of a packet and
setting a transmission-in-progress flag on condition that said
transmission-in-progress flag has been cleared, and clearing
said transmission-in-progress flag on condition that packet
10 transmission has ended.

14. The data transfer control device as defined in claim
12, further comprising:

means for instructing data fetch and setting a data-
15 fetch-in-progress flag on condition that said data-fetch-in-
progress flag has been cleared, and clearing said data-
fetch-in-progress flag on condition that data fetch has ended;
and

means for instructing transmission start of a packet and
20 setting a transmission-in-progress flag on condition that said
transmission-in-progress flag has been cleared, and clearing
said transmission-in-progress flag on condition that packet
transmission has ended.

25 15. The data transfer control device as defined in claim
11,

wherein each packet stored in each of channels comprises

a linkage pointer for linking together related packets; and
wherein said read means uses said linkage pointer to
sequentially read an packet from another channel, when packet
transmission start for one of channels has been instructed by
5 said transmission start means.

16. The data transfer control device as defined in claim
12,

wherein each packet stored in each of channels comprises
10 a linkage pointer for linking together related packets; and
wherein said read means uses said linkage pointer to
sequentially read an packet from another channel, when packet
transmission start for one of channels has been instructed by
said transmission start means.

17. The data transfer control device as defined in claim
13,

wherein each packet stored in each of channels comprises
a linkage pointer for linking together related packets; and
20 wherein said read means uses said linkage pointer to
sequentially read an packet from another channel, when packet
transmission start for one of channels has been instructed by
said transmission start means.

18. The data transfer control device as defined in claim
11, further comprising:

write-back means for writing-back acknowledgment

information that is sent from a transfer destination of the packet into a channel of said plurality of channels, which is a transmission origin of said packet, within said send packet area.

5 19. The data transfer control device as defined in claim 12, further comprising:

 write-back means for writing-back acknowledgment information that is sent from a transfer destination of the packet into a channel of said plurality of channels, which is a
10 transmission origin of said packet, within said send packet area.

 20. The data transfer control device as defined in claim 13, further comprising:

 write-back means for writing-back acknowledgment
15 information that is sent from a transfer destination of the packet into a channel of said plurality of channels, which is a transmission origin of said packet, within said send packet area.

 21. The data transfer control device as defined in claim
20 15, further comprising:

 write-back means for writing-back acknowledgment information that is sent from a transfer destination of the packet into a channel of said plurality of channels, which is a
transmission origin of said packet, within said send packet area.

25 22. A data transfer control device for transferring data among a plurality of nodes that are connected to a bus, said data

transfer control device comprising:

read means for reading out a packet that has been written to storage means;

link means for providing a service for transferring said read-out packet to each of nodes; and

means for storing at least the same number of acknowledgment information items that are sent from a transfer destination of a packet as a number of packets that can be transferred in series without confirming said sent acknowledgment information.

23. A data transfer control device for transferring data among a plurality of nodes that are connected to a bus, said data transfer control device comprising:

means for setting number-of-transmission-repeats information;

control information creation means for creating basic control information;

transmission start means for instructing a start of packet transmission;

control information rewriting means for sequentially creating control information corresponding to data of a packet that is to be transferred in series, by rewriting said basic control information when packet transmission start has been instructed; and

means for continuously transferring packets, each of said packets being made up of data and sequentially created control information, until number-of-transmission-repeats information

reaches a given value.

24. The data transfer control device as defined in claim 23,

5 wherein said basic control information comprises said number-of-transmission-repeats information, a data pointer indicating an address of data that is to be read from a data area in a randomly accessible storage means, and transaction identification information; and

10 wherein said control information rewriting means rewrites said number-of-transmission-repeats information, said data pointer, and said transaction identification information.

25. The data transfer control device as defined in claim 15 1, said data transfer control device further comprising:

a first bus connected to a next-stage application;

a second bus for controlling said data transfer control device;

20 a third bus connected electrically to a physical-layer device;

a fourth bus connected electrically to said storage means; and

25 arbitration means for performing arbitration for establishing a data path between any one of said first, second, and third buses and said fourth bus.

26. The data transfer control device as defined in claim

11, said data transfer control device further comprising:
a first bus connected to a next-stage application;
a second bus for controlling said data transfer control device;

5 a third bus connected electrically to a physical-layer device;

a fourth bus connected electrically to said storage means;
and

arbitration means for performing arbitration for
10 establishing a data path between any one of said first, second,
and third buses and said fourth bus.

27. The data transfer control device as defined in claim
22, said data transfer control device further comprising:

15 a first bus connected to a next-stage application;
a second bus for controlling said data transfer control device;

a third bus connected electrically to a physical-layer device;

20 a fourth bus connected electrically to said storage means;
and

arbitration means for performing arbitration for
establishing a data path between any one of said first, second,
and third buses and said fourth bus.

25 28. The data transfer control device as defined in claim
23, said data transfer control device further comprising:

a first bus connected to a next-stage application;
a second bus for controlling said data transfer control
device;

a third bus connected electrically to a physical-layer
5 device;

a fourth bus connected electrically to said storage means;
and

arbitration means for performing arbitration for
establishing a data path between any one of said first, second,
10 and third buses and said fourth bus.

29. The data transfer control device as defined in claim
1,

wherein data transfer is performed in accordance with the
15 IEEE 1394 standard.

30. The data transfer control device as defined in claim
11,

wherein data transfer is performed in accordance with the
20 IEEE 1394 standard.

31. The data transfer control device as defined in claim
22,

wherein data transfer is performed in accordance with the
25 IEEE 1394 standard.

32. The data transfer control device as defined in claim

23,

wherein data transfer is performed in accordance with the IEEE 1394 standard.

5 33. Electronic equipment comprising:

a a data transfer control device as defined in ^{CLAIM 1} ~~any of claims~~
a ~~1 to 32;~~

a device for performing given processing on data that has been received from another node via said data transfer control device and said bus; and

a device for outputting or storing data that has been subjected to said processing.

34. Electronic equipment comprising:

a 15 a data transfer control device as defined in ^{CLAIM 1} ~~any of claims~~
a ~~1 to 32;~~

a device for performing given processing on data that is to be sent to another node via said data transfer control device and said bus; and

20 a device for fetching data to be subjected to said processing.